DOCUMENT RESUME

ED 186 106 PS 011 369

AUTHOR Medlin, Richard
TITLE Does Active Rehearsal Improve Young Children's Recall?
PUB DATE Apr 80
NOTE 18p.; Paper presented at the Biennial Southeastern Conference on Human Development (6th, Alexandria, VA, April 17-19, 1980).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Adults; Elementary Education; Elementary School Students; *Influences; *Memorization; *Recall (Psychology); *Young Children
IDENTIFIERS *Instructional Set; Rehearsal (Memory); *Rehearsal Strategies

ABSTRACT

This study investigates different methods of increasing children's use of active rehearsal in recall, and the extent to which this active rehearsal improves their recall. Seven groups of second grade children and one group of adults were asked to memorize a list of everyday words in four study-test trials. Two of the groups of children were given differing amounts of time for rehearsal (5 sec. vs. 10 sec. inter-item intervals) with covered (not visible) items; two other groups were given differing amounts of time for rehearsal with all items visible during rehearsal. One of the groups of children heard a tape of adults actively rehearsing, another of the groups heard a tape of children rehearsing; and one of the groups of children and the group of adults were given spontaneous rehearsal instructions. It was found that all the conditions designed to increase rehearsal activity did so, with the most effective condition consisting of extra time (10 sec. interval) plus visible items. Allowing extra time to rehearse and making the items visible both improved primacy recall. Children asked to rehearse actively with extra time and items visible recalled no differently than adults did under spontaneous rehearsal conditions. Letting children listen to rehearsal generated by others seemed to be ineffective in improving recall. (SS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED186106

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

DOES ACTIVE REHEARSAL IMPROVE YOUNG CHILDREN'S RECALL?

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Richard Medlin

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

RICHARD MEDLIN
University of North Carolina at Chapel Hill

Paper presented at the Southeastern Conference on Human Development in Alexandria, Virginia, April, 1980.

PS011369

Young children do not typically use memory strategies as effectively as adults do. In this study, we tried to improve children's recall by changing the way that they rehearsed to-be-remembered material. Specifically, we addressed two questions: How can children be helped to rehearse in a more active way than they normally would, and does this active rehearsal improve their recall?

Children's free recall performance generally improves with age, and this improvement is due in large part to an enhanced primacy effect, that is, better recall of the first in a series of items (Cole, Frankel and Sharp, 1971). These differences in recall are paralleled by age-related changes in the use of memory strategies such as rehearsal (Ornstein and Naus, 1978). For example, the probability of children voluntarily rehearsing, or verbally repeating, to-be-remembered material increases steadily as children grow older (Flavell, Beach and Chinsky, 1966).

Not only does the likelihood of rehearsal increase with age, but the character of that rehearsal changes as well. There are developmental differences in rehearsal sets, or the content of a subject's rehearsal during the interval between item presentations (Ornstein, Naus and Liberty, 1975). Younger children typically practice only one or two items together in each rehearsal set. Older children tend to rehearse more cumulatively, with three or four items in each set. This cumulative rehearsal of older subjects is

referred to as "active" rehearsal. The "activity" of rehearsal is measured by the number of items in each rehearsal set.

Several researchers have investigated the possiblility of establishing a direct connection between this rehearsal "activity" and recall (Ornstein, Naus and Aivano, 1977; Ornstein, Naus and Stone, 1977). They found that young children instructed to rehearse many items in each set, or actively, showed an enhanced primacy effect. Older children told to rehearse only one or two items per rehearsal set had a diminished primacy effect.

These studies suggest that rehearsal activity, in terms of number of items per set, is directly related to the observed developmental improvement in memory performance. They also indicate that young children do not normally rehearse actively even though they are able to when given active rehearsal instructions.

The purpose of the present study was to examine the relationship between active rehearsal and recall. Specifically, we looked at these variables: rehearsal instructions, time allowed for rehearsal, and the visibility of the items during rehearsal. Please examine SLIDE 1 as I describe the the design.

It has been suggested that young children may simply need extra time in order to use memory strategies (Chi, 1977; Ornstein, Naus, and Aivano, 1977). Perhaps children

have some sort of temporal limitation that prevents them from making use of available skills. If this were the case, children might be able to rehearse more actively if given a little extra time between item presentations. Therefore, we included two conditions of time allowed for rehearsal in this study: the standard five second inter-item interval and the extra-time ten second interval.

Making items visible during rehearsal could also aid children in implementing an active strategy (Stone, 1976). Perhaps young children cannot rehearse many items in each set because they cannot retrieve the earlier items. Such an inability would impede cumulative rehearsal. Therefore, we allowed some subjects visual access to the items so that during each inter-item interval they could look at all the items that had been presented so far. There were two conditions of item visibility: the standard condition with old items covered as each new item was presented, and the items visible condition in which all items were left in view after presentation.

The time and items visible conditions were factorially varied in a two-by-two design for subjects who were also given active rehearsal instructions. These active instructions groups, numbered 2 through 5 on slide 1, are identified by codes which represent, in an abbreviated form, the words "Active instructions", "Covered or Visible items", and "5 or 10 second interval".

The active instructions, extra time, and items visible conditions were all designed to help children rehearse more actively on their own. We also wanted to see if simply exposing children to adult's active rehearsal could help them memorize. Perhaps children are unable to produce mature rehearsal themselves under normal conditions, but can still benefit from it if it is provided for them. Therefore, we included one group of children who heard tape-recordings of adult rehearsal as the list of items was presented. This is the TEACH group, number 6 on the slide.

The procedure of playing these rehearsal tapes to children brought up the question of whether self-generated rehearsal would improve recall more than simply listening to someone else rehearse would, all other things being equal. This issue was addressed in the present study by including a group of children who heard the rehearsal protocols generated by other children as to-be-remembered items were presented. This YOKED group is number 7 on the slide.

Finally, we included a group of children given spontaneous rehearsal instructions (group number 1) to provide a baseline against which we could compare other groups. The adults (group number 8) were also given spontaneous rehearsal instructions.

In summary, the design called for seven groups of second grade children and one group of adults. The groups differed in terms of age, insructions, time allowed for

rehearsal, and the visibility of the items during rehearsal. Each group was asked to memorize a list of everyday words in four study - test trials.

As we examine the results of this study, let us return to our original questions. First, how can children be helped to rehearse more actively than they normally would? We found that instructing children to rehearse many items in each reheasal set did increase their rehearsal activity over the baseline level, as you can see in SLIDE 2. For these children given active rehearsal instructions, allowing extra time to rehearse and making all the items visible also improved rehearsal activity. Extra time was especially helpful when all the items could be seen. Adults rehearsed more actively than children under the same conditions, but not as actively as children given extra time and items visible. In summary, all the conditions designed to increase rehearsal activity did so.

Our second question was, does this active rehearsal improve children's recall? Recall was analyzed according to each item's serial position in the to-be-remembered list. SLIDE 3 shows the probability of recall plotted as a function of blocks of two serial positions for the active instructions groups. On each graph, the baseline Spontaneous group is represented by solid circles connected by solid lines. As you can see, the AC10, AV5 and AV10 groups showed an enhanced primacy effect relative to the

Spontaneous group. Among the four active instructions groups, allowing extra time to rehearse and making the items visible both improved primacy recall. Active instructions alone did not improve recall, as the AC5 group's recall was not significantly different from that of the Spontaneous group.

The curve of the AV10 group appears to be elevated overall when compared to the Spontaneous group, and in fact only the AV10 and ADULT groups were superior to the Spontaneous group on recall averaged across all serial positions. The items visible condition suppressed the expected recency effect (better recall of the final items in the list) common to all other groups.

Adults recalled more than children in the Spontaneous group, as you can see in SLIDE 4. They did not recall significantly more than children in the AV10 group. The study showed that exposing children to the rehearsal protocols of adults (TEACH) or actively rehearsing children (YOKED) did not improve recall, and that the rehearsal-generating children's recall did not differ from the YOKED children's recall. In this final slide (SLIDE 5), you can compare the serial position curves for all of the groups.

To summarize, this study showed that although young children did not normally rehearse actively, they could be readily helped to do so. Simply asking children to rehearse many items per set was sufficient to initiate active

rehearsal. These instructions were especially effective when the children were given extra time or could see all the items at once during rehearsal. When the children had one or both of these advantages, their recall also improved. In fact, children asked to rehearse actively with extra time and items visible recalled no differently than adults did under spontaneous rehearsal conditions. Adults, of course, rehearsed more actively and recalled more than children did under the same conditions. Letting children listen to rehearsal generated by others seemed to be ineffective in improving recall, even though self-generated rehearsal was not found to be intrinsically superior.

Several consclusions may be drawn from this research. First, the present experiment replicated three previous observations: one, that the activity of spontaneous rehearsal increases with age (Ornstein, Naus, and Liberty, 1975; Naus, Ornstein, and Aivano, 1977; Ornstein, Naus, and Stone, 1977; Stone, Naus, and Ornstein, 1977); two, that rehearsal activity can be increased through instructions (Ornstein, Naus, and Stone, 1977; Stone, Naus, and Ornstein, 1977); and three, that free recall performance improves with age (Cole, Frankel and Sharp, 1971).

The rehearsal activity of the standard active instructions group here, however, was lower than that typically found in other studies: an average of 2.7 items per set here compared with three to four items per set in

other studies. Also, no simple active instructions effect on recall was found. These results suggest that there may be a lower limit for the effects of rehearsal activity on recall, and that this limit might be between two and three items per rehearsal set.

Letting children see all the items was the most effective way to improve both rehearsal activity and recall. The rehearsal activity average of over seven items per set in the group with extra time and items visible was the highest in this study. Children's recall in this group was also higher than that of any group except the adults. Thus if there is an upper limit on rehearsal activity in terms of improving recall, it is more than the three to four items per set suggested by other researchers (Naus, Ornstein, and Aivano, 1977; Stone, Naus, and Ornstein, 1977).

These results also suggest three other conclusions. One, children's rehearsal activity must more than double that of adults in order to bring their recall up to the adult level. Two, these results point out the importance of reading over to-be-remembered material for children's memory. Finally, the premise that retrieval of earlier items for cumulative rehearsal is not how active rehearsal improves memory was supported (Stone, 1976). The subjects here who recalled well did not have to retrieve any earlier items, because the items were visible during rehearsal.

Based on this study, we feel that the two research questions facing us now are: under what conditions can children's recall be improved by the rehearsal of others, and how do the limits for the effects of rehearsal activity on recall change with age?

REFERENCES

Chi, M. Age differences in the speed of processing: A critique. Developmental Psychology , 1977, 13 , 543-544.

Cole, M., Frankel, F. & Sharp, D. Development of free recall learning in children. Developmental Psychology , 1971, 4 , 109-123.

Flavell, J., Beach, D. & Chinsky, J. Spontaneous verbal rehearsal in a memory task as a function of age. Child Development , 1966, 37 , 283-299.

Naus, M., Ornstein, P. & Aivano, S. Developmental changes in memory: The effects of processing time and rehearsal instructions. Journal of Experimental Child Psychology, 1977, 23 , 237-251.

Ornstein, P. & Naus, M. Rehearsal processes in children's memory. In P. Ornstein (Ed.), Memory Development in Children . Hillsdale, New Jersey: Erlbaum, 1978.

Ornstein, P. & Naus, M. "Rehearsing" according to artificially generated rehearsal patterns: A reading aloud procedure. Manuscript in preparation, 1978.

Ornstein, P., Naus, M. & Liberty, C. Rehearsal and organization processes in children's memory. Child Development , 1975, 26 , 818-830.

Ornstein, P., Naus, M. & Stone, B. Rehearsal training and developmental differences in memory. Developmental Psychology , 1977, 13 , 15-24.

Stone, B. A developmental study of the role of retrieval in active rehearsal . Unpublished Masters thesis, University of North Carolina, 1976.

Stone, B., Naus, M. & Ornstein, P. An analysis of active rehearsal in children's memory. Paper presented at the convention of the American Psychological Association, August, 1977.

SLIDE 1

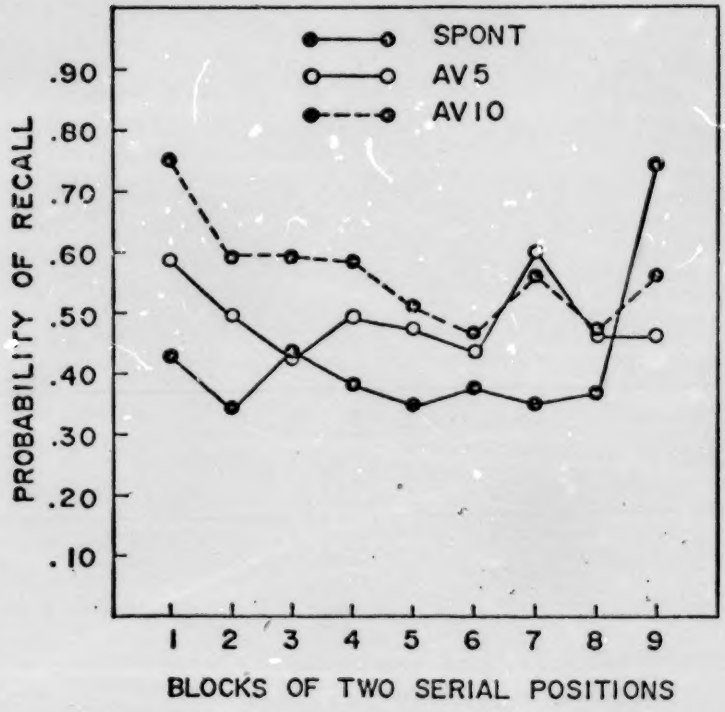
Group	Age	Rehearsal Conditions		
		Instructions	Inter-item interval	Previous items are:
1. SPONT	Second grade	Spontaneous	5 Seconds	Covered
2. AC5	Second grade	Active	5 Seconds	Covered
3. AC10	Second grade	Active	10 Seconds	Covered
4. AV5	Second Grade	Active	5 Seconds	Visible
5. AV10	Second grade	Active	10 Seconds	Visible
6. TEACH	Second grade	Listen to tape of ADULT rehearsal	5 Seconds	Covered (but heard on tape)
7. YOKED	Second grade	Listen to tape of AC5 rehearsal	5 Seconds	Covered (but heard on tape)
8. ADULT	College Sophomores	Spontaneous	5 Seconds	Covered

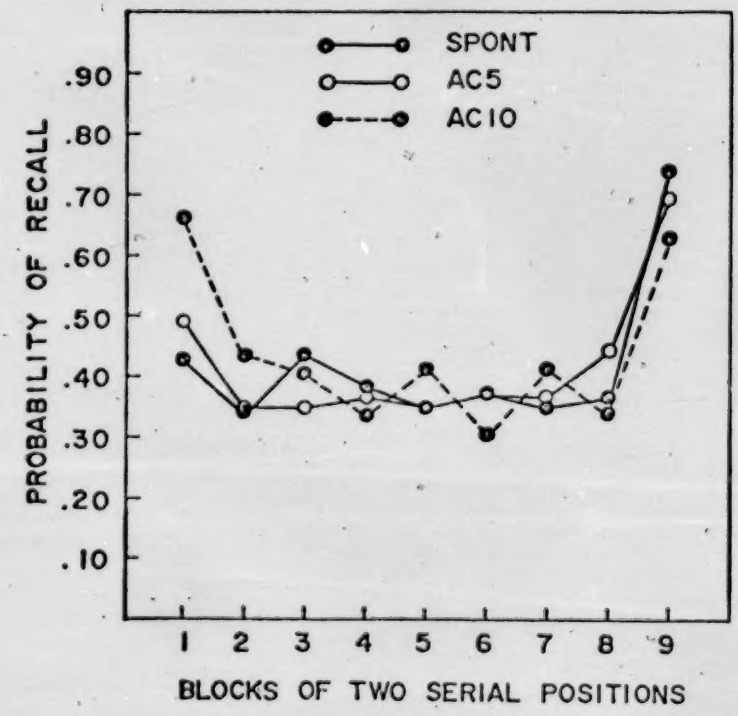
SLIDE 2

GROUP	REHEARSAL
SPONT	1.082
AC5	2.744
AC10	3.756
AV5	4.455
AV10	7.076
TEACH	4.240
YOKED	2.744
ADULT	3.567

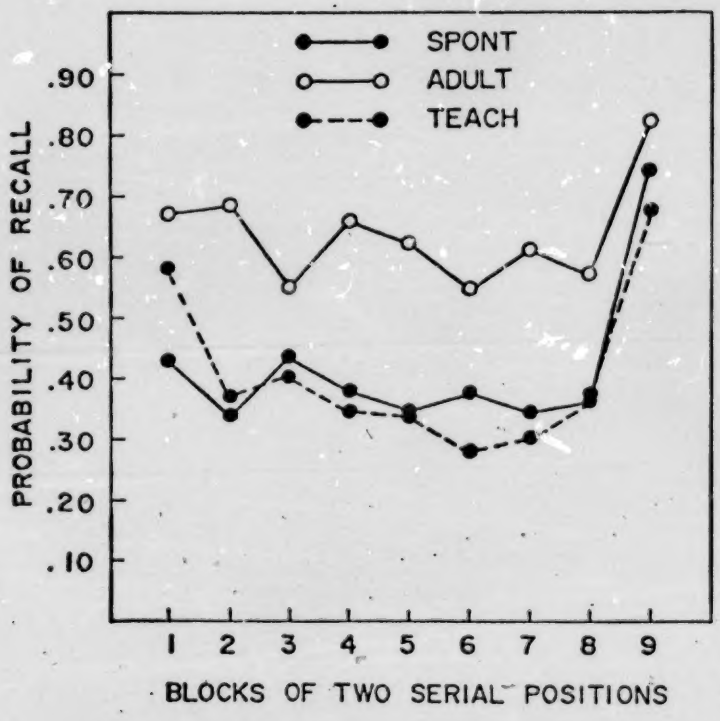
Group means for rehearsal activity (number of different items in each rehearsal set).

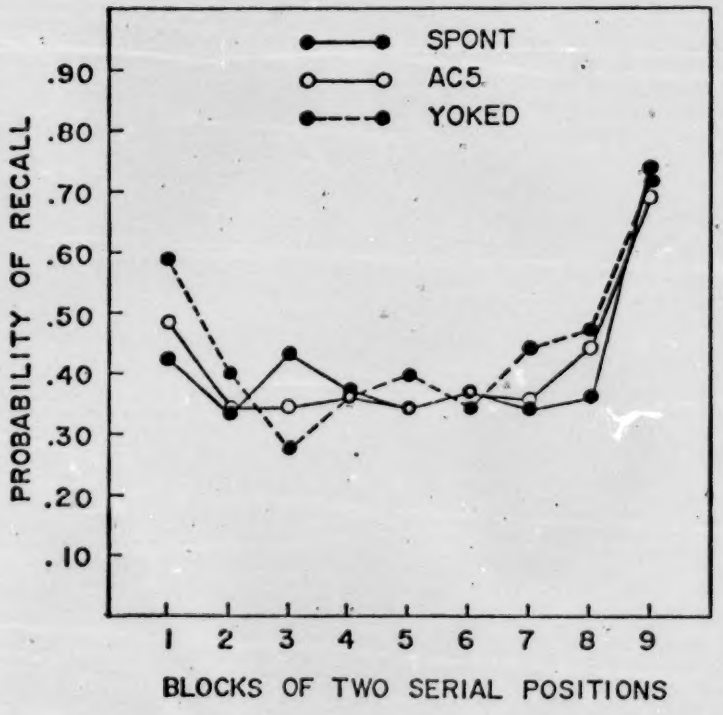
SLIDE 3


SPONT
AV5
AV10
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS

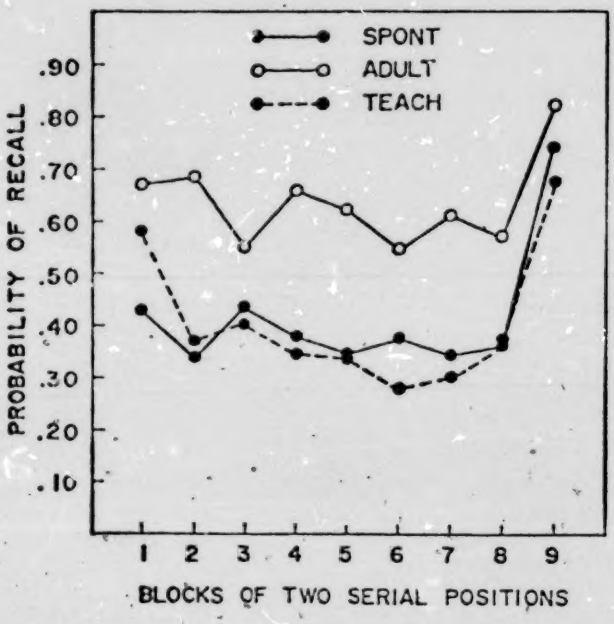

SPONT
AC5
AC10
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS

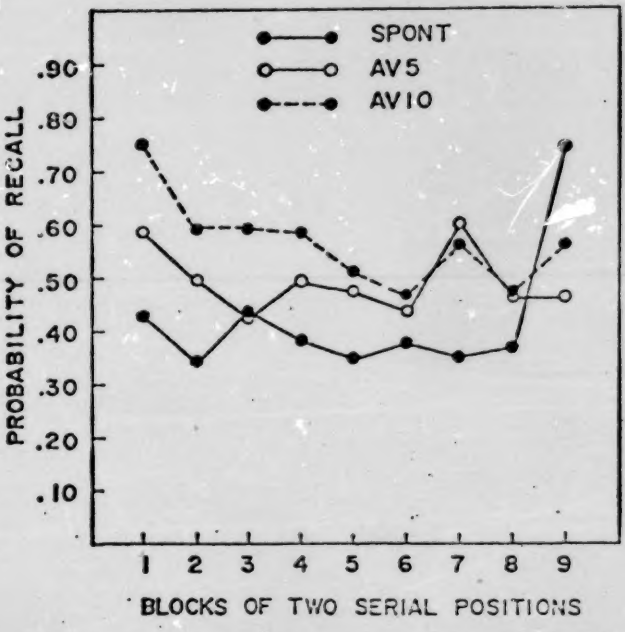
SLIDE 4

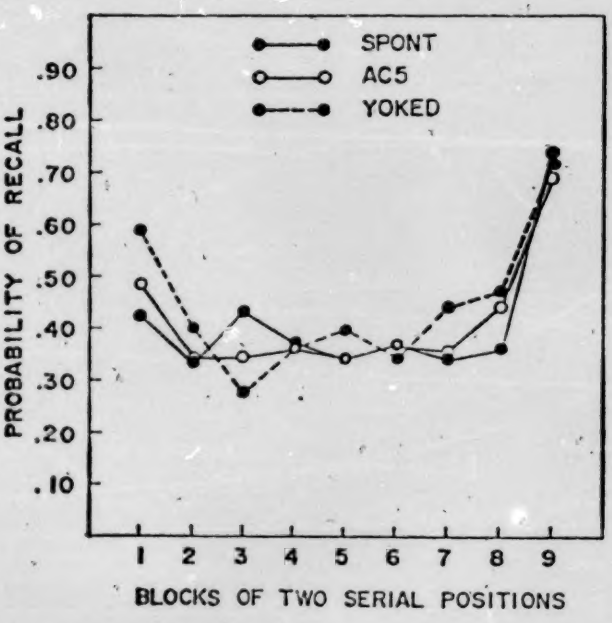

SPONT
ADULT
TEACH
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS

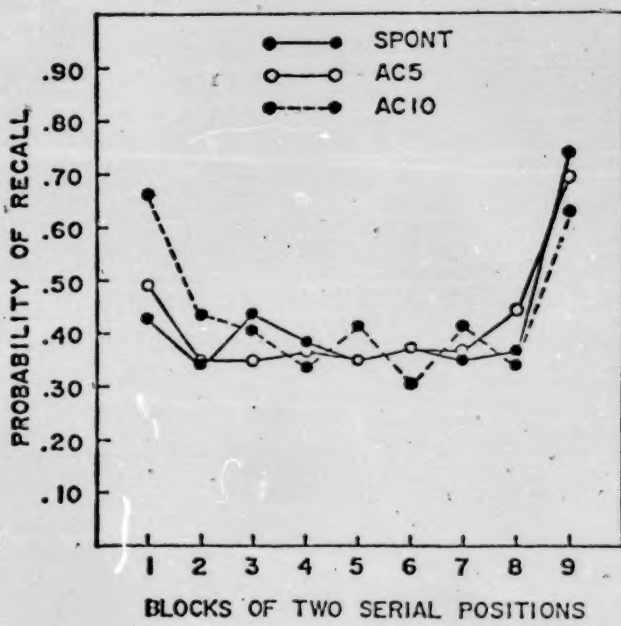

SPONT
AC5
YOKED
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS

SLIDE 5


SPONT
ADULT
TEACH
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS


SPONT
AV5
AV10
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS


SPONT
AC5
YOKED
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS


SPONT
AC5
AC10
PROBABILITY OF RECALL
.90
.80
.70
.60
.50
.40
.30
.20
.10
1 2 3 4 5 6 7 8 9
BLOCKS OF TWO SERIAL POSITIONS